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Extracorporeal fibrinogen adsorption--efficacy, selectivity and safety in healthy subjects and patients with foot ulcers.

Richter WO, **Schneidewind JM**, **Ramlow W**, **Jahn P**, **Jung N**, **Nielebock E**, **Tachezy H**, **Eulitz K**, **Koll R**, **Klinkmann J**.

Institute for Lipid Metabolism and Hemorheology, Windach, Germany. ifh-richter@t-online.de

The elimination of fibrinogen from plasma improves plasma viscosity and whole blood viscosity. For extracorporeal adsorption of fibrinogen the pentapeptide gly-pro-arg-pro-lys was coupled to sepharose CL-4B. Columns containing 100 ml of coupled sepharose CL-4B were used to eliminate fibrinogen from the plasma of 8 healthy male subjects (mean age 27.4 +/- 4.3 years, height 180.9 +/- 8.3 cm, weight 85.1 +/- 13.6 kg). Four treatments were performed in each proband (days 1, 2, 4 and 7). Plasma fibrinogen concentration was lowered from 221.1 +/- 39.0 to 123.5 +/- 21.7 mg/dl (2275 +/- 477 ml plasma treated) by the first treatment, from 172.8 +/- 42.3 to 105.6 +/- 16.5 mg/dl (1609 +/- 761 ml) by the second, from 140.5 +/- 13.8 to 98.8 +/- 8.6 mg/dl (1224 +/- 118 ml) by the third and from 160.2 +/- 23.6 to 106.4 +/- 9.7 mg/dl (1513 +/- 521) by the fourth. Plasma viscosity was improved from 1.40 +/- 0.18 mPa s before the first treatment to 1.23 +/- 0.06 mPa s after fourth treatment, whole blood viscosity from 4.49 +/- 0.36 mPa s to 3.83 +/- 0.27 mPa s ($P < 0.01$). No clinical side effects and no clinically relevant change of laboratory parameters including in vitro tests on thrombocyte function were observed. Seven men and three women (48-75 years old, 9 patients suffered from diabetes mellitus, one patient from peripheral arterial occlusive disease, 5 patients were on regular hemodialysis) were treated by fibrinogen adsorption. Each column contained 135 ml of coupled sepharose CL-4B. Treatments were scheduled on day 1, 2, 4, 6, 8, 10, 13, 16, 19, 22, 25 and 28. 144 treatments with fibrinogen adsorption were performed. No clinical side effects due to the fibrinogen-adsorption procedure were observed. In these 10 patients the fibrinogen concentration before the first treatment was 473.7 +/- 183.7

mg/dl. In the first treatment session it was lowered to 241.4 +/- 125.8 mg/dl by treating 4270 +/- 1180 ml of plasma. In the following 134 treatments the pre-treatment concentration of fibrinogen was 262.6 +/- 83.4 mg/dl, the post-treatment concentration was 120.6 +/- 37.2 mg/dl. The mean volume of plasma treated was 3737 +/- 1643 ml, the mean duration of a treatment session (except the first treatment) was 143.7 +/- 63.1 min. In 7 patients a mean post-treatment fibrinogen concentration of < or = 123 mg/dl was obtained, in the other patients 133, 177 and 184 mg/dl. Yet, the decrease of fibrinogen concentration was also pronounced in these 3 patients: -82%, -67%, and -73%, respectively. Accelerated wound healing was observed in 9 of the 10 patients. In conclusion, affinity chromatography using the pentapeptide gly-pro-arg-pro-lys is an effective, selective and safe procedure to lower fibrinogen concentration in plasma thereby improving blood viscosity. It could be a therapeutic option in severe blood vessel disease where drug therapy is not sufficient and invasive procedures like bypass or angioplasty cannot be applied.

Publication Types:

- Clinical Trial
- Controlled Clinical Trial

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